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**The New IMF Approach to Capital Account  
Management and its Blind Spots**  
Lessons from Brazil and South Korea

Barbara Fritz and Daniela Prates



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# **The New IMF Approach to Capital Account Management and its Blind Spots**

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## **Abstract**

As emerging economies experience a boom in capital inflows, governments are increasingly concerned about the downsides of these inflows. Even the IMF (International Monetary Fund), long a stalwart proponent of financial liberalization, is engaging in a new debate on capital flow management. Drawing lessons from empirical case studies on Brazil and South Korea, this paper finds that the new IMF approach remains insufficient in three key respects. First, the organization's proposed distinction between measures, especially between permanent prudential regulation and temporary policies to shield the exchange rate, is unsustainable, especially in countries with highly sophisticated and internationally integrated financial markets. Second, country-specific factors matter. In the case of Brazil, the most important measures are those that directly address the specific institutions within its derivative market. Third, in order to provide sufficient policy space for emerging markets, the management of international capital flows, including the measures taken by advanced economies, should be permanent and bilateral.

**Keywords:** policy space | distributive consequences of financial crises | capital controls

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## 1. Introduction

Emerging economies<sup>1</sup> are coping with the problems of success. Not only do they boast growth rates that are the envy of OECD countries, but they have also recovered rapidly from the financial crisis sparked by the Lehman Brothers default in 2008. As a consequence, emerging economies are experiencing a boom in capital inflows. Many governments are becoming increasingly concerned about the downsides of such inflows. They perceive dependence on highly volatile capital flows as a threat not only to short-term financial stability but also, more generally, to their domestic policy space. The debate about capital controls, long discarded as anachronistic, has returned to the political and scholarly agenda with a vengeance.

Even the IMF (International Monetary Fund), long hostile to any kind of capital control regime, is engaging in a new debate on capital flow management, seeking to establish a set of rules for all countries. However, this debate finds the international financial institutions ill prepared, as well as much of academia. As Dani Rodrik (2010: 2) states:

We currently do not know much about designing capital control regimes. The taboo that has [been] attached to capital controls has discouraged practical, policy-oriented work that would help to manage capital flows directly.

The paper seeks to contribute to this discussion by critically reviewing the current theoretical debate and by providing insights from the empirical study of two key emerging economies, Brazil and South Korea. Even if the debate on the management of international capital flows is far from consolidated, both in theoretical terms and with regard to economic policy recommendations, the global crisis has brought about significant rethinking, especially in terms of financial re-regulation and supervision at the domestic level. There is growing consensus regarding the need for a more systemic approach to macroeconomic, monetary and financial policies (Blanchard et al. 2010; Eichengreen et al. 2011), instead of one that prioritizes price-level stabilization alone. In comparison, regulation with regard to international capital flows has received much less attention, even though these are crucial for emerging economies (Ocampo 2012). The maintenance of a stable exchange rate to preserve the competitiveness of the economy and the prevention of financial instabilities and financial crises represent particular policy challenges for countries confronted with huge capital inflows.

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<sup>1</sup> Emerging economies are defined here as those developing countries that have engaged in the process of financial globalization. This concept of emerging economies thus refers to a dynamic process as a growing number of countries have taken part in it since the 1990s.

Currency overvaluation and financial crises both have significant distributional impacts at various levels. Even though a drop in the exchange rate level (which means currency appreciation in the case of emerging economies whose exchange rate is the price of the foreign currency) may not lead to financial crises in the short or even in the middle run, the loss of international competitiveness leads to a reduction in labor-intensive exports, and privileges commodity exports, thus reducing employment domestically. Further to this, a credit boom following high capital inflows, and an increased current account deficit, raises the risk of severe financial crises due to sudden stops and reversals in capital flows. The subsequent drop in growth rates can nullify the income convergence effect between emerging and advanced economies in the current situation of double speed recovery.

Furthermore, econometric analyses find a positive and significant association between the Gini coefficient and macroeconomic volatility, especially in less developed countries (Wolf 2005; Calderón and Levy Yeyati 2009; Atkinson and Morelli 2011). Even though we know that economic growth per se does not translate automatically into a more equal distribution of income and wealth, and even if crises are not all the same, the literature does identify some common transmission mechanisms. Firstly, evidence shows that the poorest tend to lose their jobs more quickly and have fewer instruments to cushion and protect against the risk of economic contraction (Agénor 2004; Halac and Schmukler 2004; Lustig 2000; CEPAL 2010). Secondly, policy reactions to crisis, especially fiscal policies, are highly relevant in terms of their distributional effects. Even if spending cuts such as those made to social transfers can be distributed in a different manner, affecting poorer people to a greater or lesser extent, they tend to decrease the policy space for redistributive policies on the part of the State (Fanelli and Jiménez 2009; see also Valdés 2012). Last but not least, other dimensions of economic inequality, which are partially interdependent with the first two aspects, may also impact social well-being. This is particularly true in cases of unequal opportunity, where the most lasting impact of the crisis may be on those cohorts who are at vulnerable stages in their lifecycles. The same is true for horizontal inequality, especially with respect to gender-specific distributional effects of crises.

In section two we present, as our starting point, the orthodox mainstream arguments in favor of capital account liberalization. We then analyze the shift that has occurred at the IMF, as demonstrated by the organization's new framework for capital account management, and point to the limits of this framework, contrasting it with other approaches that we view as more appropriate. In section three we go on to analyze the regulation of international capital flows in Brazil and Korea. The paper closes with some final remarks on the lessons that can be drawn from these two case studies.



## 2. Reviewing the Debate

### 2.1. The Orthodoxy of Capital Account Liberalization: A Critical Review of the Arguments

Within pure neoclassical welfare theory, the potential benefits of international capital mobility are clear. Traditionally, capital account liberalization has been justified using the following main arguments:

First, intertemporal trade, that is, trade in financial assets, allows for intertemporal consumption smoothing. Temporary imports of savings permit an increase in investment and consumption over existing domestic savings funds, to be reversed later via an increased volume of produced goods and/or increased productivity (e.g. Dooley 1996). Second, given differing capital endowment – poor countries are assumed to be relatively rich in labor relative to domestically available capital, and rich countries are assumed to be the opposite – capital flows from rich to poor countries should allow for the easing of capital constraints in developing economies. The increased supply of capital leads to higher investment and growth rates and reduces the price for capital, that is, it leads to interest rate parity, in the long run. It also allows for the international diffusion of new technology (i.e. World Bank 2001). Third, the international allocation of capital is seen as permitting better risk diversification<sup>2</sup> and the possibility of financing riskier projects. At the same time, it is expected to increase real and financial diversification at the receiving side.

Yet the empirical evidence did not deliver such a clear picture. In particular, the series of financial crises in emerging economies during the 1990s, most of which had made significant advances in liberalizing their capital accounts and were confronted with large booms and busts in international capital flows, called into question the potential effects of international financial liberalization listed above. The empirical research on these and earlier experiences did not support the clear-cut answers laid out in the theory. “Despite a huge research literature, there is nothing near to a professional consensus on whether the net impact of full capital account liberalization on growth poverty, or volatility should be regarded as favorable or not” (World Bank 2001: 20). Indeed, the empirical evidence on the high volatility of international capital flows convinced several outstanding economists (Bhagwati 1998; Rodrik 2008; Williamson et al. 2003; and Williamson 2005) of the problems related to international capital mobility.

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<sup>2</sup> Tobin expressed it quite vividly when he won the Nobel Prize in Economics in 1981 for his portfolio theory: “Well, you know, diversification - don’t put all your eggs in one basket” (Fettig 1996).



At the same time, however, a relevant strand of the literature continued to consider capital account liberalization the best solution. Key IMF publications (Rogoff et al. 2004; Kose et al. 2006; IMF 2008) acknowledged the potential risks and costs in terms of financial instability and overall macroeconomic volatility but still gave capital account liberalization a prominent role for its “collateral effects”: with open capital accounts, international financial markets could impose discipline on economic policies, unleashing forces that would result in better government and corporate governance and thereby lead to financial development. Thus, the presumption that financial markets always act rationally, on the basis of complete information and the ability to evaluate the complex interaction of microeconomic and macroeconomic risks, was held up. At the same time, this approach presumed that there existed a best set of policy measures defined by market actors that would fit all countries, notwithstanding their differences in terms of history and institutions.

Even within the camp of capital account liberalization advocates, however, there was a broad consensus that financial globalization should necessarily be combined with prudential financial regulation and risk management, and be carefully sequenced (e.g. Mussa et al. 1998; World Bank 2001).

International financial integration has not increased macroeconomic volatility or crisis frequency in countries with well-developed domestic financial systems and a relatively high degree of institutional quality; it has, however, increased volatility for countries that have failed to meet these preconditions or thresholds. [... ] The IMF’s ‘integrated’ approach [...] envisages a gradual and orderly sequencing of external financial liberalization and emphasizes the desirability of complementary reforms in the macroeconomic policy framework and the domestic financial system as essential components of a successful liberalization strategy. (IMF 2008: 3)

However, there were no clear criteria regarding the thresholds of financial liberalization, a criticism the IMF’s Independent Evaluation Office also raised (IMF 2005). Financial stability was assumed to be one of the key preconditions for liberalization, as the empirical results suggested, while financial globalization was assumed to be the best way to achieve this goal. In its “integrated” or “sequencing” approach, the IMF at the same time gave financial sector reform top priority when recommending the liberalization of the capital account (IMF 2008: 14). However, it remained rather unclear regarding the interdependencies between existing low financial stability, high reform efforts in this field, and simultaneous liberalization of the capital account (Priewe 2011).

## 2.2. From Radical Financial Liberalization to the Management of Capital Inflows: Capital Controls as a “Means of Last Resort”

Since 2008, the global economy has been marked by financial turmoil and sharp recessions in most advanced economies, while most emerging economies and some developing countries have been faring much better in financial and economic terms (Ocampo 2012; Canuto and Giugale 2010 and Canuto and Leipziger 2012). This “double speed recovery,” expressed by higher growth rates in emerging and developing economies than in developed economies, will spur the convergence of per capita incomes between advanced and emerging market economies (EMEs), thus decreasing global economic inequality between poorer and richer countries.

Within this context, there has been a new boom in capital flows to emerging economies since the global financial crisis of 2008, specifically since the first half of 2009. This new boom – the fourth in the post-Bretton Woods era – has been driven by the post-crisis circumstances. After a brief interruption in the fourth quarter of 2008 and early 2009, capital flows returned to emerging economies, chasing yields in the context of abundant liquidity and lower interest rates in advanced economies as a consequence of the countercyclical monetary policies launched in response to the crisis. Even though these flows have lost some momentum more recently, especially since the third quarter of 2011, due to the worsening of the euro crisis and another double-dip threat, we assume that the emerging markets will experience an extended period of high capital inflows (Akyüz 2011; BIS 2010; Canuto and Leipziger 2012).

As before the crisis, the currencies and assets of several emerging countries have become, again, the target of carry trade activities – due to interest rate differentials – and other kinds of capital flows. The resulting combination of high growth rates, accelerating inflation (also associated with a renewed commodity prices boom), excessive currency appreciation and/or asset price overshooting have confronted the emerging economies with policy dilemmas (Akyüz 2011; BIS 2010). In this scenario, the adoption of a restrictive monetary policy would help to contain growth and inflationary pressures, but it would encourage further capital inflows, which, in turn, would foster the asset price boom and exchange rate misalignment, aggravating the risk of future sudden stops and subsequent financial crises.

Concerned with the amount and volatility of these flows and their potentially damaging consequences for emerging economies, the IMF has been making a clear shift in its official position regarding the evaluation of capital controls (IMF 2010; IMF 2011a; Ostry et al. 2010; Ostry et al. 2011a). It views these recent capital flows mostly as a

consequence of international interest rate differentials and indicates that these flows may be temporary in nature, with potential future sudden stops and reversals in the event of a change in advanced economies' interest rate levels. "Concerns that foreign investors may be subject to herd behavior and suffer from excessive optimism, have grown stronger, and even when flows are fundamentally sound, it is recognized that they may contribute to collateral damage" (Ostry et al. 2010: 4).

While the IMF generally views capital inflows as beneficial, the main concern behind the recent change in its position is that they may have a series of negative effects that could exceed the distortionary costs to the domestic economy, which have usually been highlighted as one of the main costs of capital controls.<sup>3</sup> The negative effects associated with large capital inflows are as follows: first, an appreciation of the domestic currency beyond the equilibrium level; second, the fiscal costs of an accumulation of foreign exchange reserves beyond the appropriate level; third, the creation of inflationary pressures in the event of incomplete sterilization; and fourth, increased financial fragility due to the creation of bubbles in subsectors such as real estate or equity markets, which is magnified by maturity and currency mismatches related to short-term foreign inflows.

In an initial paper, a staff position note of February 2010 (Ostry et al. 2010) that has since received significant attention from academics and policy makers,<sup>4</sup> the IMF authors clearly defined the application of capital inflow controls as a measure of last resort, when all other macroeconomic policies are exhausted:

We argue that if the economy is operating near potential, if reserves are adequate, if the exchange rate is not undervalued, and if the flows are likely to be transitory, then controls on capital inflows – together with macroeconomic policy adjustment and prudential measures – may usefully form part of the policy toolkit. (Ostry et al. 2011b: 562)

However, there is great concern within the IMF in relation to two points: First, the management of capital inflows should not be used as a substitute for what are seen as necessary adjustment processes and reforms. This concern applies especially to the standard orthodox policy recipes, such as balanced fiscal policies and a monetary policy oriented towards price stabilization. If, for example, a pro-cyclical fiscal deficit

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3 The arguments in favor of capital import controls distinguish these measures from capital outflow controls, which are seen as useful only during crisis periods and only as a supplement to more fundamental policy adjustment (IMF 2012).

4 Rodrik (2010), commenting on the shift in the IMF's evaluation of capital controls, enthusiastically called this "an end of an era in finance."

causes the domestic central bank to raise interest rates in order to counterbalance the potential inflationary effects of increased public demand, public spending should be curbed and/or taxes raised. It is argued that this measure, applied instead of capital controls, could allow an easing of the monetary policy, which would then lead to a decrease in capital inflows due to the reduction of the interest rate differential (see also IMF 2011a: 7).

Second, the IMF formulates a significant caveat for the potential multilateral effects of capital controls used by individual countries. As these could undercut the adjustment of undervalued currencies (however such an undervaluation may be defined and measured) in emerging economies, they are seen as a possible threat that might further increase global imbalances. Additionally, controls imposed by some countries could have negative externalities in the form of spillover effects on neighboring countries. Even if there is no clear empirical evidence,<sup>5</sup> successful capital controls, so the argument goes, could deviate international flows to other emerging economies that are not willing or not able to establish such controls, and may be even less able to absorb these flows.

Since its initial publication on the topic, the IMF has produced a series of papers in order to refine this new framework for capital controls, and to strengthen it based on country studies (IMF 2010, 2011a, 2011b, 2012; Ostry 2011a). While these papers adhere to the strict formulation of macroeconomic preconditions that must be fulfilled, as cited above, they aim to more clearly define terms and concepts for an adequate management of capital flows, and introduce some modifications with respect to the first papers.

Ostry (2011a: 11) first states that there is no unique, generally accepted legal definition of capital controls. While in the broadest sense these are measures meant to affect the cross-border movement of capital, in its subsequent publications the IMF sticks not to this functional definition, but to a juridical definition brought forward by the OECD in its Code of Liberalisation of Capital Movements (2009). This definition considers capital controls to be subject to liberalization obligations only if they discriminate between residents and nonresidents.<sup>6</sup>

5 While the IMF (2011b) finds that the spillover effects of capital flow management measures are rather weak, Forbes et al. (2011) argue that the signaling effects of capital controls may deviate international capital flows to third countries that do not apply these measures. They label this effect “bubble thy neighbour.”

6 An explanation for the highlighting of this jurisdictional criteria is provided by the IMF (2011a: 45): „This prioritization of measures takes into account institutional and political economy concerns flowing from the general standard of fairness that a member expects that its nationals will enjoy as a result of its participation in a multilateral framework.”

Based on this definition, Ostry et al. (2011b: 563) seek to establish a clear-cut triple hierarchy between instruments to manage capital flows. They argue that macroeconomic policies should always be applied first and until exhaustion. They also outline a clear hierarchy between prudential regulations of the domestic banking system, which might affect cross-border flows that are intermediated by domestic financial institutions, and proper capital controls, defined as measures that restrict capital transactions between residents and nonresidents, as the latter might, from a welfare perspective, have a higher distorting effect than the former. Yet distinguishing between prudential regulation and proper capital controls is in many cases all but easy. For example, a measure limiting the exposure of domestic banks' foreign currency lending to unhedged domestic borrowers that discriminates on the basis of currency denomination instead of residency would count as prudential financial regulation, even though it would in fact have an effect on capital inflows and thus emulate a capital control measure.

This problem is somehow fixed by the introduction of the new term "capital inflow management," used in all subsequent IMF publications, in place of "capital controls." Of special relevance here is a paper endorsed by the IMF board in March 2011 that defines a set of guidelines (see IMF 2011a; also Ostry et al. 2011a). It provides two explanations for the choice of this new term: first, to avoid the pejorative term "controls," and second, to generate a broader definition that goes beyond the strictly legal definition of capital controls. Capital inflow management is thus defined as the sum of the measures established to slow exchange rate appreciation and/or divert capital flows to other countries. It comprises measures distinguishing between residency statuses and between currency denominations, as well as other regulations such as minimum holding periods and taxes on specific investments that are typically applied in the nonfinancial sector (IMF 2011a: 6, see also p. 40f.).

Yet even with this broadened definition and a broader view of the concepts of proper regulation of the domestic financial sector and of cross-border flows, the IMF (2011a) insists in its proposed framework on this hierarchy, where the equal treatment of investors independently of their nationality is the highest priority. It also introduces a further distinction between measures that are assumed to have the potential macroeconomic and multilateral effect of dampening currency appreciation, and other measures of a general prudential nature. While the latter may be used permanently, the former should be applied only as a second line of defense and only for limited periods of time. Thus, while the authors state that this framework should be applied in a rather flexible manner to specific countries, at the same time it is intended to be relevant for all countries with open or relatively open capital accounts (IMF 2011a: 42).

### **2.3. Capital Management Techniques: Taking into Account Entangled International and Domestic Financial Markets**

In fact, enormous advances have been made by the IMF in its positions on the management of capital flows, particularly when we bear in mind that until very recently it downplayed the damaging effects of high and volatile capital flows in favor of so-called positive collateral effects, especially the disciplinary effect of international investors' decisions on domestic policies. The shift towards recognizing the potential dangers of capital inflow surges and the complex consequences in terms of increasing financial fragility and the challenges for macroeconomic policies represents an enormous advance that should not be understated.

However, by defining capital controls as a means of last and only temporary resort, the IMF's new approach poses serious limits to the policy space emerging economies require. Indeed, a number of authors argue strongly in favor of capital controls not as a temporary but rather as a permanent part of the policy toolkit. This is because most of these emerging economies are still more vulnerable to external trade and financial shocks than advanced ones, due to a higher degree of financial fragility and a lower level of economic diversification. According to this latter perspective, capital controls should be part of an overall package comprising exchange rate flexibility, the maintenance of adequate international reserves, sterilization, and the development of the financial sector. There is a clear need for the deployment of multiple instruments instead of a selective approach (Mohan 2012). Consequently, Gallagher, Griffith-Jones and Ocampo (2012: 5), prefer to use the term "capital account regulations" to underscore the fact these belong to the broader family of financial regulations. These regulations should comprise not only inflows but also outflows, may vary between price-based and quantity-based instruments, and should be complemented by capital flow management policies in the "source" countries of capital flows in order to distribute the burden of the volatility of global financial flows (Gallagher, Griffith-Jones and Ocampo 2012; Rodrik 2010; Cordero and Montecino 2010; Nogueira 2012; Priewe 2011).

Furthermore, the hierarchy that is still persistent in the new IMF framework is inappropriate and confusing, as, in order to prioritize and legitimize specific policies, it seeks to draw lines between macroprudential measures, measures to influence the exchange rate, and capital controls defined in a jurisdictional manner as being discriminatory with respect to the residency of investors. The distinction between prudential measures on the one hand, defined as permanent, and temporary capital flow management on the other, defined as only temporary, is highly unclear. For instance, the framework categorizes capital requirements for foreign exchange loans



as a permanent macroprudential measure, while it classifies reserve requirements for foreign exchange deposits as part of the toolkit of capital flow management techniques for influencing the exchange rate (IMF 2011a: 40f. and 45).

A deeper look at the experience of Korea and Brazil, however, makes clear that there is often a great deal of synergy and overlap between these measures. We can identify important feedback loops between capital controls and prudential financial regulation, as well as between these measures and macroeconomic policy. For example, some prudential financial regulation instruments (such as limits on banks' operations in foreign currency) function in practice as capital controls, while some of these capital controls (such as taxation of foreign loans) contribute to reducing systemic financial risks (Epstein, Grabel and Jomo 2004). Moreover, prudential regulation and some types of capital controls aimed at slowing down credit growth or bursting the asset bubble may contribute to inflation control (and thus assist monetary policy) because of their impact on aggregate demand (see also Blanchard et al. 2010).

As these synergy and overlap effects are especially relevant in emerging economies with a high degree of financial openness and sophisticated domestic financial markets, we approximate the approach of Epstein, Grabel and Jomo (2004), who combine the set of prudential financial regulations and the traditional menu of capital controls and summarize both under the term "capital management techniques" (CMTs) (ibid.: 2).

By drawing on this concept of capital controls as part of a broader CMT approach, we stick to the overall idea that these techniques focus on both (i) limiting financial fragility associated with capital reversals and (ii) increasing the policy space available to exert control over key macroeconomic prices such as the exchange rate and the interest rate, mainly to enable the pursuit of countercyclical policies during booms and busts and to open up space for redistributive policies. Here, we also put special emphasis on the fact that there are important feedback loops between these two goals: currency appreciation stimulates speculative positions, for example, in foreign exchange derivatives, threatening financial stability. Therefore, the capacity to maintain the exchange rate at a competitive level (second goal) contributes to financial stability (first goal). However, while in some contexts both goals are relevant and have a countercyclical dimension, in others policy makers may face only the macroeconomic policy challenge. For instance, nonresident portfolio investments in domestic currency denominated instruments do not result in currency mismatches and financial distress, as the exchange rate risk remains with the external investor. Yet, the demand for domestic currency creates pressure towards currency appreciation, which threatens a country's export performance and thus its overall macroeconomic stability.



In order to analyze the effectiveness of CMTs in the case studies presented in the next section, however, we simultaneously seek to identify the particularities of each of these measures, clarifying the differences between capital controls and prudential financial regulation with respect to their impact on international capital flows.

We define capital controls as a range of financial regulation tools (based on price or quantity, or on residency or currency) that manage those cross-border flows (both inflows and outflows) that are not (or are only partially) mediated by the domestic banking system and are therefore outside the scope of prudential financial regulation. In other words, these controls can influence portfolio decisions regarding the capital flows of foreign (nonresident) investors as well as those of resident companies and banks. On the other hand, we define prudential financial regulation as regulatory tools that consist mainly of capital requirements and which affect the asset and liability positions of resident banks. Therefore, this latter type of CMT only affects the portfolio decisions of banking institutions, which are subject to the Basel capital requirements (based on risk-weighted assets) and other rules established by the domestic regulatory authority (in most countries, the central bank).

Additionally, we demonstrate through our case studies that even this kind of broad concept may not include all the regulations necessary to effectively manage foreign investors' portfolio reallocations and their impact. A third type of regulation, to regulate foreign exchange (FX) derivatives instruments, may also be required within the toolkit of capital management techniques. Such regulations appear to be of special relevance in cases characterized by a high degree of financial openness, a high level of diversification, and a sophisticated domestic financial market – for instance, the countries we analyze in the following section. We label these instruments, the focus of which is FX derivatives, “derivatives management techniques” (DMTs).

### **3. Case Studies: Brazil and South Korea after the Global Financial Crisis**

Despite the recent advances in the literature on capital controls and capital management techniques, country experiences before (as many comparative case studies in the past have demonstrated; see for instance Ariyoshi et al. 2000; Herr and Priewe 2006; Magud et al. 2011) and after the global financial crisis (see, for instance, Klein 2012) indicate that designing these techniques is a highly complex process, as it depends on a set of macroeconomic, institutional and structural factors, such as the degree of financial openness, the composition of capital flows and the features of financial and currency markets.

In order to better understand these techniques and the rationale behind each kind of instrument (capital controls and prudential financial regulation), it is necessary to complement the conceptual and analytical analysis presented in the previous section with comparative case studies of countries that have faced policy dilemmas and have resorted to specific CMTs and DMTs (as defined above) to cope with the boom in capital flows to emerging economies that has emerged since the global financial crisis, and the different currency speculation strategies, among them derivative carry trade operations which profit from the high differential between the domestic and the international interest rate.

Unlike the case in the pre-crisis context, emerging-market countries (even those with current account deficits) are now unwilling to adopt a hands-off approach to capital inflows. As Rodrik (2006: 12) has pointed out, during the period 2003–2007 these countries “over-invested in the costly strategy of reserve accumulation and under-invested in capital account management policies.” In addition to its fiscal cost, the use of this strategy to curb exchange rate appreciation can lead to faster credit growth and increases the risk of asset price overshooting, the negative consequences of which became evident with the global financial crisis. Such countries have thus learned lessons from the crisis, which demonstrated that reserve accumulation could not cushion them against the adverse effects of financial globalization or the potentially harmful effects of excessive currency appreciation. The experiences of Brazil and the Republic of Korea (hereafter, Korea), the two countries selected for the case studies in this paper, exemplify this.

The following criteria have guided our selection of case studies. First, the similarities between Brazil and Korea’s CMT strategies before the global crisis, which combined a high degree of financial openness with an aggressive reserve accumulation policy under a macroeconomic regime based on a dirty floating<sup>7</sup> and an inflation target policy. In both countries domestic currency appreciation was the main mechanism used to alleviate inflationary pressures; this ensured the efficiency of the inflation target regime. Nevertheless, the cost of this strategy was a drop in export competitiveness that led export companies to search for hedges and/or speculative gains in an attempt to remedy their situation.

Second, both countries have well-developed and actively traded equity and public bonds markets as well as liquid and deep FX derivatives markets, although each has its own specific institutional features. As Mihaljek and Packer (2010: 51) have pointed

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7 A system of floating exchange rates in which the government or the country’s central bank occasionally intervenes in order to reduce the volatility or to change the direction of the value of the country’s currency.

out, Brazil and Korea have the largest foreign exchange (FX) derivatives markets among emerging economies. The combination of these two factors explains the strong contagion effect that the crisis had on the Brazilian and Korean currency and financial markets. Both countries were significantly affected by the global financial crisis, in spite of their current-account surpluses until 2007 and their huge international reserves.<sup>8</sup>

Third, the two countries have experienced a period of significant capital inflows since 2009 and have been the main destinations for portfolio inflows during the new boom in capital flows to EME.<sup>9</sup> Fourth, while each country's degree of financial openness and macroeconomic regimes have not fundamentally changed since the global financial crisis, policy makers in both Brazil and Korea (and other emerging countries) have resorted to CMTs to halt the trend of currency appreciation and/or the building up of speculative bubbles in asset prices (while rather restrictive monetary and fiscal policies have been adopted to slow the economy and contain inflationary pressures).

### 3.1. Korea

As mentioned above, Korea's and Brazil's experiences in managing capital flows have been very similar since the financial crisis of the 1990s. After 1997, the Korean government decided to increase the country's financial openness. As Kim and Yang (2010) point out, it dismantled most capital flow restrictions and, as was the case in Brazil as well, capital inflows and outflows became market-determined.<sup>10</sup> During the capital flow boom of 2003–2007 Korea adopted the strategy of reserve accumulation and accelerated the relaxation of outward investment controls in order to stem appreciation pressures; this resulted in the elimination of most of the controls by 2007 (Baba and Kokenyne 2011).

The resumption of inflows following the global financial crisis was led by portfolio flows into debt and equity markets and was driven by both external (the post-crisis circumstances) and internal factors (Korea's quick economic recovery and sound macroeconomic situation). Short-term bank debt, however, remained lower than in the pre-crisis period. The composition of cross-border flows was a consequence of the CMT strategy launched by Korean authorities since November 2009 to deal with the new boom in capital flows (see chart 1 and table 1). This strategy, in turn, had been shaped by the huge contagion effect that the global financial crisis had in the Korean

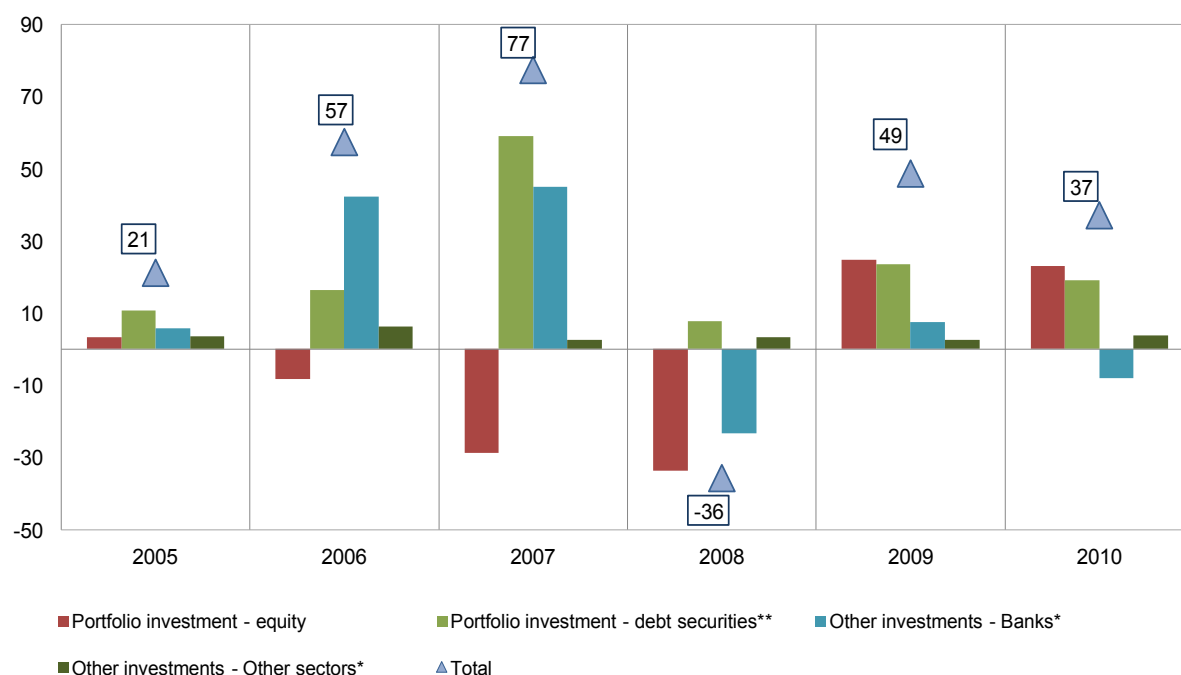
<sup>8</sup> See Prates and Cintra (2010).

<sup>9</sup> Besides Brazil and Korea, the other countries that have been the main recipients of capital inflows in the recent boom are South Africa, Peru, Thailand, Indonesia and Turkey. For more details, see IMF (2011a).

<sup>10</sup> For details on Korea's capital account liberalization since the 1980s, see Kim and Yang (2010).

banking system.<sup>11</sup> Furthermore, it is worth mentioning that Korea is the only OECD member that has adopted CMT after the global financial crisis. Therefore, Korean authorities have been able to launch these measures despite the constraints implied by this membership.

**Chart 1: Korea – Key Types of Financial Capital Inflows (Billion USD)**



\* Mainly external debt contracted with international banks

\*\* In the country and in the international market

Source: IFS/IMF. Author's compilation.

As in Brazil, the sharp devaluation of the Korean currency (won) was associated with companies' operations with exchange derivatives. The overshooting of the won–USD exchange rate (see chart 2) between August 2007 and October 2008 was the result of the relationship between FX derivatives operations carried out in the onshore Over the Counter (OTC) market and the large short-term debt contracted by the country's banks. This link was related to the institutional framework of Korea's FX derivatives market, wherein gains or losses are liquidated in US dollars (i.e. they are deliverable), as is the case in most countries, though not in Brazil.

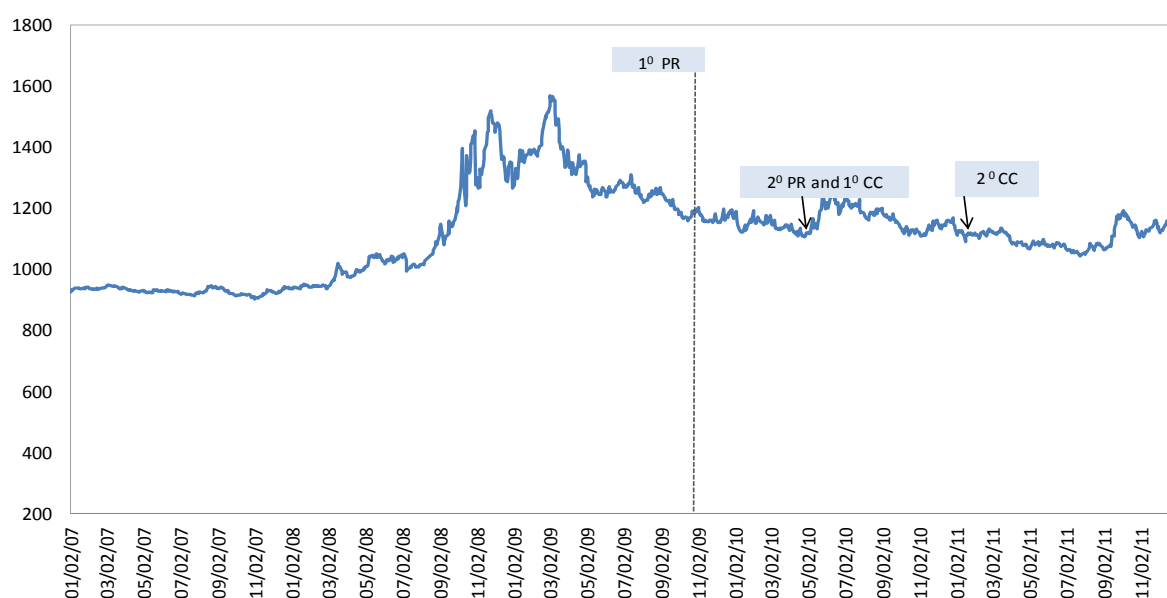
Before the crisis, the banks sold so-called “knock-in-knock-out” (KIKO) foreign exchange options, an exotic OTC derivative for hedging against the appreciation of

<sup>11</sup> In 2009, the government initiated a US\$130-billion rescue plan to stabilize the domestic financial market, especially the foreign exchange market, because of the huge foreign currency liabilities of its banks. It also adopted other policies intended to alleviate the harmful effects of the crisis on the domestic financial system (Prates and Cintra 2010).

the local currency in relation to the dollar, to exporter companies (mainly shipbuilders). As Dodd (2009) explains, this option allowed firms to sell dollars at a fixed won-dollar exchange rate (which is the price of US dollars) in the event that the exchange rate fluctuated within a range pre-stipulated in the contract, providing a long position in the local currency. The potential gains of the companies on the transactions (in case the won appreciated as they were long in this currency) were capped or limited while the losses (in case the won depreciated) were not limited and indeed were geared so that losses would occur at a faster rate (usually twice the rate) for a given change in the underlying exchange rate.<sup>12</sup>

These companies began to hedge their foreign exchange exposure in 2004 and increased their hedging ratio in anticipation of continued won appreciation. In addition, banks – mainly the local branches of foreign banks, which were subject only to risk management standards and not to the liquidity ratios or other direct regulations applicable to Korean banks – engaged in interest rate arbitrage operations, borrowing dollars on a short-term basis, selling these dollars for won on the spot market, then buying certificates of deposit or other domestic bonds and selling the won forward for dollars. It was against this backdrop of strong capital inflows that authorities progressively liberalized capital outflows (Baba and Kokenyne 2011; IMF 2011a).

**Chart 2: Won-USD Exchange Rate**



Note: PR = Prudential Regulation; CC = Capital Control.

Source: Bloomberg, author's compilation.

<sup>12</sup> According to Dodd (2009), who provides further details on these derivatives, similar exotic derivatives were traded in other emerging economies, such as Mexico, India, Sri Lanka, Malaysia, Indonesia, China and Brazil.

To make operations in the OTC derivatives market possible and profitable, Korean and locally based foreign banks borrowed in US dollars to sustain their positions in this market. With the outbreak of the crisis and the credit crunch in international financial markets, these banks were unable to roll over their maturing short-term external liabilities as global banks cut credit lines in order to shore up liquidity. Consequently, the former started buying dollars to liquidate their external liabilities, thus exerting devaluating pressure on the won. This depreciation led to losses on the part of those companies that relied on the currency's appreciation and forced them to hand over the corresponding dollars, some of which had to be obtained on the foreign exchange market, to the banks. This put further depreciation pressure on the won. Around 520 small and medium-sized export companies that had purchased KIKO options lost an estimated USD 2 billion, being on the verge of insolvency. Several local Korean banks suffered when their customers sued or became bankrupt (IMF 2011a; Kim and Yang 2010; Dodd 2009).

The contagion effect of the global financial crisis thus illuminated the high vulnerability of the Korean banking system to changes in global funding conditions due to its large levels of short-term external debt and related FX derivatives operations. The CMTs adopted by the Korean government since 2009 have therefore aimed, mainly, to reduce this vulnerability on a permanent basis, without attention to prospects of immediate inflows per se (table 1). In Korea the FX derivatives operations have had an impact on the exchange rate as well as on quantity of foreign currency flows because the Korean FX derivatives market is deliverable in US dollars.

As the targets of the CMTs were banks' spot and forward foreign exchange exposures, Korean authorities launched a set of prudential financial regulation measures between November 2009 and June 2010 (see table 1) with the goal of strengthening banks' foreign exchange liquidity management and limiting banks' short-term debt and forward contracts to sustainable levels. The measures for reaching these FX forward positions (for instance, caps on banks' FX forward operations relative to their equity capital and on forward contracts between banks and exporters relative to their export receipts) indirectly aim to reduce external borrowing by the banking sector, inasmuch as before the crisis Korean and locally based foreign banks borrowed in US dollars to sustain their positions in OTC derivatives market. Therefore, prudential financial regulation measures, which only addressed banks' asset and liability positions in both spot and forward markets, helped to prevent the external debt from returning to pre-crisis levels (see chart 1) and to limit onshore FX derivatives operations. This is because both issues were closely linked with the banks' portfolio decisions. Hence, it can be said that these measures contributed to the protection of the exchange rate from renewed

appreciation pressures resulting from banks' short-term external debt. Since the adoption of the first prudential financial regulation measure, the won–USD nominal exchange rate has been nominally stable (the won has appreciated only 0.9 percent; see chart 2).

**Table 1: Korea – CMTs After the Global Financial Crisis**

Date	Type	Measure
Nov. 2009	Prudential financial regulation	(i) Higher foreign currency liquidity standards to reduce the maturity mismatch of banks' foreign currency assets and liabilities and to improve the quality of their liquid assets. (ii) A 125 percent cap (relative to underlying export revenues) on forward foreign exchange contracts between banks and exporters.
June 2010	Prudential financial regulation	(i) A ceiling on resident banks' FX derivatives contracts of no more than 50 percent and for foreign bank branches of no more than 250 percent of their capital in previous month. (ii) A limit on banks allowing them to provide only 100 percent of underlying transactions for forward contracts with exporters (previously 125 percent). (iii) A stipulation that resident banks' FX loans and held-to-maturity securities (equal to or more than one-year maturity) must be covered by at least 100 percent of FX borrowing with maturity of more than one year.
June 2010	Capital controls	A limitation of foreign currency financing to overseas use only, with some exceptions for SME manufacturers.
Jan. 2011	Capital controls	Reintroduction of a 14 percent withholding tax on nonresidents' purchases of treasury and monetary stabilization bonds, bringing the tax back in line with the tax on residents' bond purchases. Foreign corporations and nonresidents are subject to the withholding tax, but those based in countries that have double taxation treaties with Korea and official investors are exempt.

Source: IMF (2011a); Pradhan et al. (2011).



Yet as Pradhan et al. (2011) have stated, the decline in demand for currency forwards – especially from shipbuilders, due to a smaller order book in the post-crisis period – has also been a contributing factor to the stability of the won-USD nominal exchange rate. Furthermore, the measures to limit forward contracts between banks and exporters apply only to onshore entities; this allows these agents to engage in contracts offshore using non-deliverable forward contracts (NDFs).<sup>13</sup>

In addition to these prudential financial regulation measures, Korea has also adopted two types of capital controls. The main measure is the withholding tax on foreign holdings of government bonds and central bank securities, which brings the tax back in line with the tax on residents' bond purchases. This price-based capital control was reimposed in January 2011 due to the strong increase in debt portfolio inflows (see chart 3), which reached record levels (IMF 2011a). However, the impact of this measure on portfolio inflows is likely to be marginal, for two reasons. Firstly, foreign corporations and nonresident investors based in countries that have double taxation treaties with Korea are exempt (and Korea has this kind of treaty with more than 70 countries) (Pradhan et al. 2011). Secondly, this tax has not encompassed equity portfolio flows, which have also increased significantly since 2009.

### **3.2. Brazil**

The Brazilian government responded to the 1999 currency crisis with the adoption of a new set of economic policies based on an inflation target system and a dirty floating exchange rate. This change in the macroeconomic regime was accompanied by a process of financial opening that had begun in 1990 and gained momentum in January 2000, when Resolution CMN n. 2689 allowed the unrestricted access of nonresident (i.e., foreign) investors to all segments of the domestic financial market, including the derivatives market.

In this context of high capital mobility, the post-global-crisis scenario combined with domestic factors (mainly the resumption of economic growth, the depth and liquidity of capital and derivatives markets and very high interest rates by international standards) resulted in large capital inflows and strong appreciation pressures between 2009 and the third quarter of 2011. Indeed, Brazil became the main destination for capital flows in Latin America in this period (see table 2 below).

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13 For details on NDF contracts in emerging economies' currencies, see He and McCauley (2010).

**Table 2: Brazil and Korea, Selected Macroeconomic Data**

Year	Policy rate (in percent)		FX reserves (billion USD)		Inflation (in percent)		Fiscal result (nominal) (in % of GNP)	
	Brazil	Korea	Brazil	Korea	Brazil	Korea	Brazil	Korea
2003	23.55	3.96	48.844	154.509	17.05	3.5	-5.23	0.47
2004	16.38	3.6	52.458	198.175	6.29	3.6	-2.9	2.72
2005	19.14	3.33	53.216	209.968	5.77	2.8	-3.58	3.38
2006	15.32	4.23	85.148	238.388	3.27	2.2	-3.63	3.92
2007	12.05	4.73	179.431	261.771	4.08	2.5	-2.80	4.65
2008	12.44	4.73	192.842	200.479	6.57	4.7	-2.0	2.96
2009	10.16	2.04	231.888	265.202	5.06	2.8	-3.3	-1.14
2010	9.89	2.17	280.570	286.926	5.11	2.9	-2.5	-0.04
2011	11.76	3.1	343.384	298.233	6.6	4.0	n.a.	n.a.

Source: Oxford Economics, IFS/IMF, Brazil and Korea Statistics. Authors' compilation.

Two specific features of the Brazilian economy – related, respectively, to macroeconomic and institutional factors – reinforced the economic policy dilemmas faced by monetary authorities of emerging economies in terms of macroeconomic management in the post-crisis context.

With regard to the macroeconomic factor (which is not the focus of this paper and is therefore not detailed here), it is worth mentioning that the reserve accumulation strategy faced two important constraints: a significant amount of public debt concentrated in short term maturities and a very large differential between internal and external interest rates, which made the cost of sterilization operations excessively high and reduced the central bank's policy space for exchange rate management (Prates, Cunha and Lélis 2009).

With respect to the institutional factor, the FX derivatives market has played a central role in the trajectory of the Brazilian currency (BRL), both before and after the global financial crisis (predominantly an appreciation trend, that is, a drop in the BRL–USD exchange rate, which is the price of US dollars). This has undermined both the monetary authority's capacity to influence the determination of the exchange rate (based on conventional exchange rate interventions) and the efficacy of CMTs.

This central role of the FX derivatives market stems from the much higher liquidity and depth of the FX futures market in comparison with the FX spot market. Moreover, the predominance of the organized segment in the FX derivatives markets (i.e., futures) is a specific feature of Brazil's currency market. According to Avdjiev et al. (2010), the BRL was the second most traded currency worldwide in the organized derivatives markets in 2010, while the financial volume of FX derivatives traded in onshore OTC markets was low (US\$18 billion in April 2010) relative to other emerging markets, such as Korea. The special features of the Brazilian FX derivatives market stem from a set of regulatory, institutional and macroeconomic factors which have reinforced each other since the end of the 1990s.

First, despite extensive liberalization of international capital inflows and outflows, convertibility of the Brazilian currency in general is highly restricted at the level of the domestic financial sector. This is a consequence of a specific process of high inflation with widespread indexation especially in the financial sector during the 1980s and the first half of the 1990s. Indexation prevented the dollarization of domestic financial operations and the disintermediation of the banking process. In this context, the financial sector engaged in sophisticated trading operations. Financial sophistication was further facilitated by the dominance of large domestic and foreign banks. Another institutional trait of the Brazilian financial system, also linked with the particular nature of the inflationary process in the country, is the existence since the 1980s of a developed derivatives exchange (the organized derivatives market, called BM&F in the Portuguese acronym<sup>14</sup>), where FX futures contracts are traded.

Brazilian authorities have been keen in their regulatory efforts to prevent dollarization during the last decades. Thus, all transactions have to be settled in the domestic currency (the Brazilian real - BRL). Foreign currency bank deposits are prohibited, with only a few exceptions.<sup>15</sup> Consequently, only dealer banks which have access to short term external credit lines in the international interbank market, can hold spot FX positions.<sup>16</sup>

This is a relevant background for regulatory asymmetry within the Brazilian currency market, where the stricter regulation of the FX spot market stands out in comparison with the FX futures market. While in the former only a few banks which have been

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14 The BM&F merged with Bovespa, the main Brazilian stock exchange on 25 March 2008.

15 FX bank accounts are allowed only for embassies, multilateral institutions and assurances companies that deal with foreign trade. However, their use is very limited (Rossi 2012).

16 Most of the spot FX transactions are settled by transfers of funds between residents foreign accounts. The exception is the purchases and sells of foreign currencies related with international travels. In this case, the physical flow is allowed (BCB 2012).

accorded “Authorised Dealer” status from the Brazilian Central Bank can hold foreign currency positions (in Brazil, positions in USD)<sup>17</sup>, in the latter any agent can hold these positions as long as they fulfill minimum standards required by the Brazilian exchange (BM&FBovespa) (Ventura and Garcia 2010; Kaltenbrunner 2010). In the case of FX futures contracts, the main agents are resident banks (whether Brazilian- or foreign-owned), resident institutional investors, non-financial resident companies and non-resident investors (who have unrestricted access to the derivatives market since January 2000). The wide range of participants in the FX futures market ensures both a greater trade volume and a larger diversity of opinions which underlie the liquidity and depth of this market.

This same intention to prevent dollarization is behind another distinguishing feature of the Brazilian FX derivatives (futures and OTC) market: it is non-deliverable, as gains or losses in these operations are settled in domestic (BRL) and not in the foreign currency (USD), which is normally the case in other countries. Precisely because these operations are settled in BRL, there are no limits to non-bank positions in the FX futures market. This feature has broad implications. It has contributed to high liquidity and, therefore, to the key role of this market in exchange rate formation.

With respect to institutional factors, some traits of the Brazilian financial system have also contributed to the growth of the FX futures market. Here, the entry of foreign banks plays a specific role. After a banking crisis in 1995, the government fostered the entry of new foreign banks,<sup>18</sup> some of which had expertise in derivatives trading.<sup>19</sup>

Concerning the macroeconomic factors, two stand out. First, the adoption of a “dirty” floating regime in January 1999, which has increased both demand for hedging currency risk and for speculating through bets on exchange rate changes. Second, between 2003 and 2011, Brazil offered one of the highest policy rates and, consequently, one of the greatest interest rate differentials in comparison with other emerging economies (Prates, Cunha and Lélis 2009).

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<sup>17</sup> In August 2012, only 14 banks held this status, see: <http://bit.ly/XOjIF9>.

<sup>18</sup> On the entry of foreign banks to the Brazilian bank system, see Paula (2011).

<sup>19</sup> According to Farhi (2001), the trade volume in FX future contracts started growing in the aftermath of this entry, during the second half of the 1990s. Some Brazilian banks, with less expertise in derivative trading, began to simulate the strategy of their foreign peers. Until the price stabilization introduced with the Real Plan in July 1994, the spot gold market (negotiated at BM&F) was an important locus of investors' bets on exchange rate changes inasmuch as this market was linked through arbitrage to the FX black market. In this context, the BCB intervened in the spot gold market with the aim of influencing the black market exchange rate.

During periods of low risk aversion both before (2003 to mid-2008) and after the global financial crisis (mainly, from mid-2009 and mid-2011), foreign institutional investors, primarily hedge funds, have been the most important investor group in the Brazilian FX futures market, fostering a real appreciation trend through derivative carry trade. This is a different kind of currency speculation strategy from the canonical carry trade through spot market operations – that is, borrowing low-interest-rate currencies and lending high-interest-rate currencies (Burnside et al. 2006; Gagnon and Chaboud 2007, Kaltenbrunner 2010).

In derivatives markets, the carry trade expresses itself as a bet which results in a short position in the funding currency and a long position in the target currency (Gagnon and Chaboud 2007). Due to the huge differential between the internal and external interest rates in Brazil, foreign investors have made one-way bets on the appreciation of the Brazilian currency through short positions in the FX futures market (selling US dollars and buying BRL), which has resulted in downward pressure on the USD price and, thus, upward pressure on the BRL price (Farhi 2010).

The derivatives carry trade turns out to be even more attractive in Brazil due to the non-deliverable characteristic of the FX futures market. Foreign and domestic agents can engage in derivatives carry trade without disbursing one US dollar. Until October 2010, furthermore, this carry trade strategy could also be executed without the expenditure of one single BRL because investors could meet their margin requirements in BRL via domestic borrowed securities or guarantees from local banks. Despite the predominance of foreign investors in the derivatives carry trade, profit-seeking domestic agents such as institutional investors and companies have also engaged in it. Furthermore, the February 2006 regulation exempting foreign investors from the income tax on returns on government bonds also promoted the derivatives carry trade.

Consequently, the macroeconomic setting has reinforced the liquidity and depth of the Brazilian FX futures market, which reached its peak in terms of contracts negotiated in 2005. According to Johnson (2007), in the first quarter of 2007, “BM&Fs U.S. Dollar contract led the sector (i.e. the foreign currency sector) for the second year in a row with a 51.4% increase to 10.97 million contracts. It was followed by CMEs Euro FX contract which rose 22% to 6.73 million contracts”.

Moreover, the outstanding performance of the BRL futures market has contributed to the increased trading of the Brazilian currency on offshore OTC markets through Non-Deliverable Forward (NDF) contracts.<sup>20</sup> This is because the existence of a deep futures

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<sup>20</sup> On the NDF market of emerging economy currencies, see Ho and McCauley (2010).

market has made it possible for foreign banks that have an account with the local exchange to sell BRL offshore (meeting the demand of international investors who were betting on the BRL appreciation) and simultaneously hedge their BRL exposure in the onshore future market (Kaltenbrunner 2010). The growth of the NDF market for the Brazilian real, in turn, has enhanced even more the liquidity and depth of the Brazilian futures market. In this setting, some international investors began to use the BRL futures contracts as a proxy for other emerging currencies' derivatives which have been highly correlated with the Brazilian real (such as the Turkish lira and the South-African rand) but do not have deep and liquid derivatives markets, which further increased the trading of BRL futures contracts.

FX futures and spot markets are linked by arbitrage that is carried out primarily by banks as the dealers in the FX spot market. These agents enter the opposite position of foreign investors in the FX futures market (long position in US dollars and short in BRL), buying US dollars in this market and selling them in the spot market. With this strategy, banks have earned arbitrage profits and, at the same time, generated additional pressure on the USD spot price, which has meant a drop in the BRL–USD spot exchange rate and an appreciation of the Brazilian currency. Hence, banks have played a central role in conveying appreciation pressure through the carry trade in the futures market to the BRL–USD spot exchange rate.

When it comes to the application of CMTs, the above features of the Brazilian market have presented Brazilian policy makers with greater challenges than those faced by their counterparts in other countries with similarly large derivative markets. While other countries have had to address the low efficacy of capital controls in dealing with FX derivatives operations (due to their high degree of leverage (as to be carried out it requires only a margin requirement), Brazilian authorities have also had to take into account the possibility that these operations could simulate the impact of capital flows on the exchange rate without any effective foreign currency flows. CMTs focused on international capital flows have thus proven to be ineffective in restraining them; prudential financial regulation is also insufficient in this case as it does not reach foreign investors and non-bank resident agents.

The Brazilian regulatory authorities have recognized this constraint. Since October 2010 they have implemented, along with CMTs, specific measures to reach these operations. These measures, which we call “derivatives management techniques” (DMTs), apply to the FX derivatives operations of all agents, be they nonresidents or residents, financial or nonfinancial actors. This new technique, which is neither capital control nor prudential financial regulation, has been key in restraining the BRL



appreciation trend and, in turn, mitigating the Brazilian government's economic policy dilemma regarding how to contain the growth rate and inflationary pressures without reinforcing exchange rate misalignment (see table 2 above).

In October 2010 the Brazilian government strengthened a price-based capital control (a financial tax on inflows called Imposto de Operações Financeiras, IOF), which had already been adopted at a low level in 2009, in order to curb the undesirable effects of portfolio investment in equity and fixed income – an important type of capital flow outside the scope of prudential financial regulation – on financial and macroeconomic stability. A few days later the government also closed a loophole that had allowed foreign investors to avoid the higher tax on fixed-income investments established previously. Moreover, it implemented the first DMT: the financial tax (IOF) on margin requirements for FX derivatives transactions was increased from 0.38 percent to 6 percent, and some loopholes for IOF on margin requirements were closed (see table 3).

However, the first rounds of CTMs and DTMs proved to be insufficient: the IOF was too low to stem the derivatives carry trade due to the latter's high degree of leverage, and private agents found loopholes to circumvent the regulations (see charts 3 and 4). One of the main strategies that banks used after October 2010 to circumvent the new measures was to increase their short dollar positions in the spot currency market. In fact, the IOF on portfolio inflows encouraged the build-up of long real/short dollar positions in the onshore derivatives market; that is, it encouraged the derivatives carry trade supported by resident banks which assume the contrary position of nonresident investors in the derivatives market.



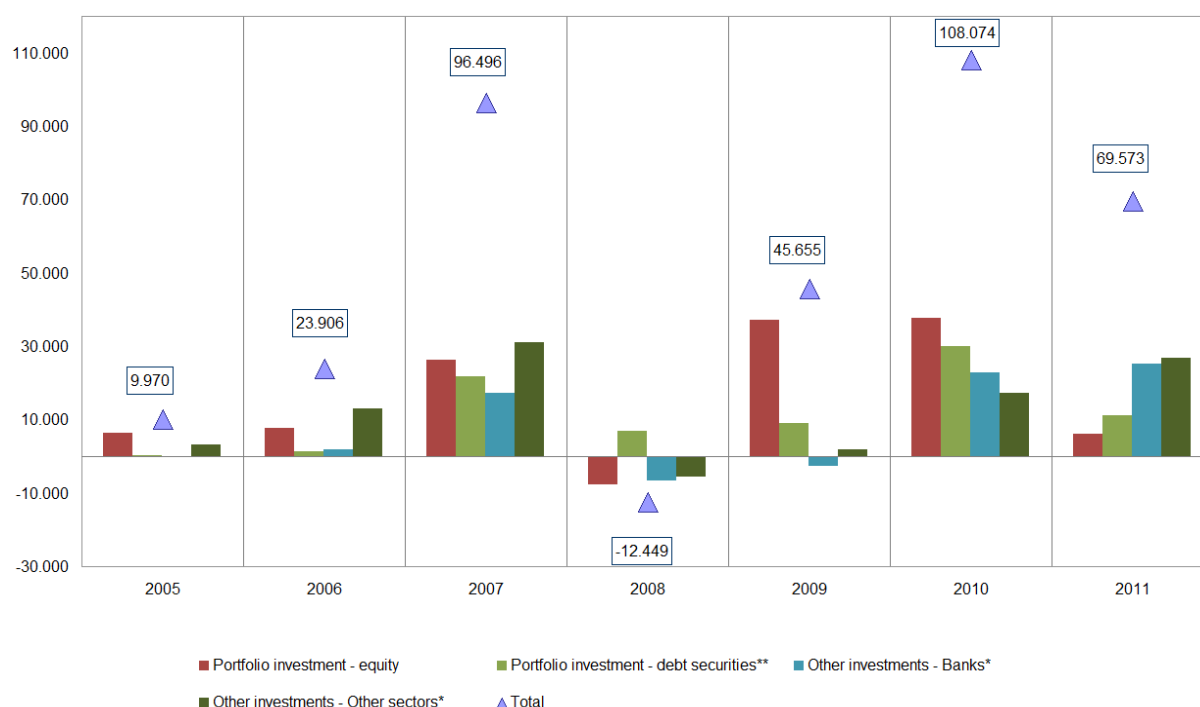
**Table 3: Brazil – Capital Management Techniques (CMTs) and Derivatives Management Techniques (DMTs) after the Global Financial Crisis**

Date	Type	Measure
Oct. 2009	Capital controls	Implementation of a 2 percent financial transaction tax (IOF) on nonresident equity and fixed-income portfolio inflows by the Ministry of Finance.
Oct. 2010	Capital controls	(i) Increase in IOF from 2 to 4 percent for fixed-income portfolio investments and equity funds. (ii) Increase in IOF to 6 percent for fixed-income investments. (iii) Introduction of limitations on foreign investors' ability to shift investment from equity to fixed-income investments.
Oct. 2010	Derivatives management techniques	(i) Increase in IOF on margin requirements for FX derivatives transactions from 0.38 percent to 6 percent. (ii) Closing of loopholes for IOF on margin requirements: foreign investors in the futures markets no longer allowed to meet their margin requirements via locally borrowed securities or guarantees from local banks, which had allowed them to avoid the tax.
Jan. 2011	Prudential financial regulation	Noninterest reserve requirement equivalent to 60 percent of bank's short dollar positions in the FX spot market that exceed US\$3 billion or their capital base, whichever is smaller (to be implemented over 90 days).
Mar. 2011	Capital controls	Increase in IOF to 6 percent on new foreign loans (banking loans and securities issued abroad) with maturities of up to a year. Companies and banks previously only paid a 5.38 percent IOF on loans up to 90 days.
April 2011	Capital controls	(i) Extension of 6 percent IOF to the renewal of foreign loans with maturities of up to a year. (ii) Extension of 6 percent IOF to both new and renewed foreign loans with maturities of up to 2 years.
July 2011	Prudential financial regulation	Mandatory noninterest reserve requirement for amounts over US\$1 billion or their capital base (whichever is smaller).
July 2011	Derivatives management techniques	(i) Appointment of the Monetary Council of the Brazilian Central Bank (CMN) as the agency responsible for regulating the derivatives market. (ii) Requirement that all FX must be priced according to the same method. (iii) Requirement that all FX derivatives must be registered in clearing houses. (iv) Requirement that FX exposure of all agents must be consolidated (liquid position). (v) Implementation of a 1 percent financial tax on all agents' excessively long positions on BRL. This tax can be increased to 25 percent. On March 2012 exporters' hedge operations (up to 1.2 times the exports of the previous year) were exempted from the IOF.
Dec. 2011	Capital controls	Reduction of IOF on equity and fixed-income (linked with infrastructure projects) portfolio inflows to 0 percent.

Source: Authors' own compilation based on the Brazilian Central Bank and Ministry of Finance websites.

To close this loophole, the Brazilian Central Bank imposed a noninterest reserve requirement, a prudential financial regulation tool, on these positions in January 2010 (see table 3).<sup>21</sup> Nevertheless, by switching to short-term foreign borrowing, banks and companies were able to find another channel for regulatory arbitrage. As a regulatory response, the government imposed the IOF on short-term foreign borrowing in March 2011. However, private agents were able to make longer-term loans in the context of excess of liquidity and searching for yield in the international financial market. In April the government subsequently extended the IOF to these loans. Thus, until the first half of 2011, the CMTs mainly impacted the composition of inflows rather than their volume (see chart 3).

**Chart 3: Brazil – Capital Inflows (Million USD)**



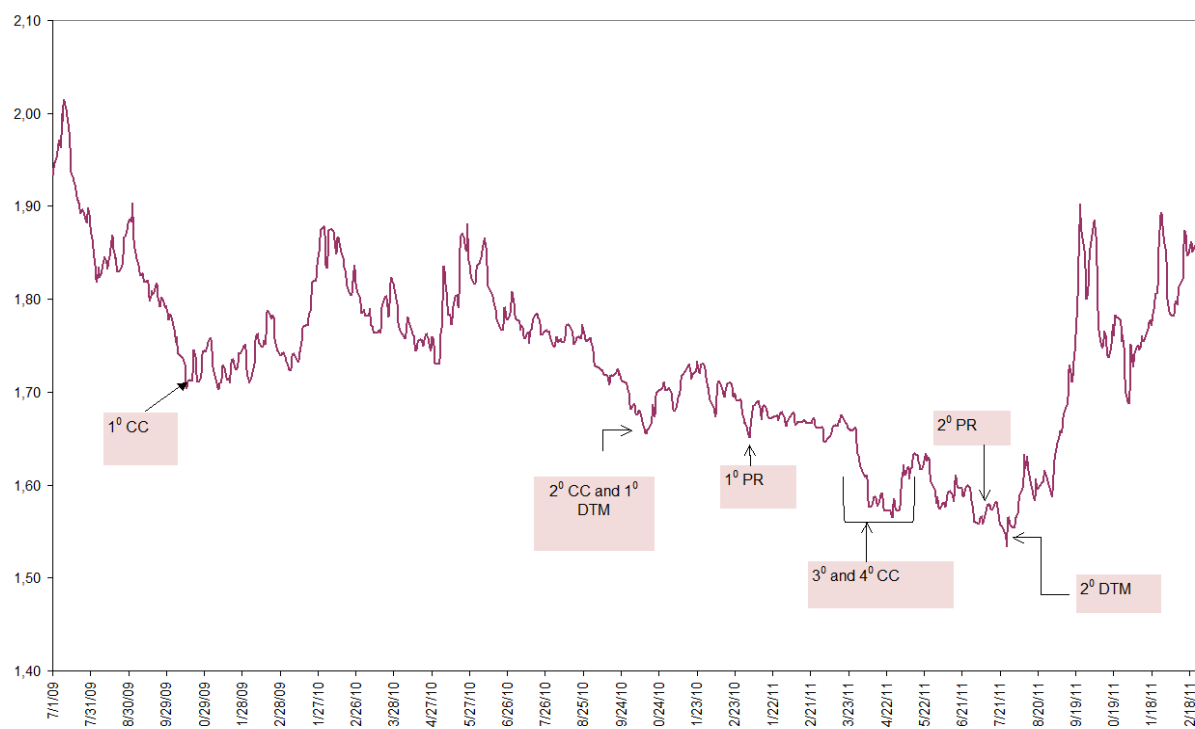
\* Mainly, external debt contracted with international banks.

\*\* In the country and in the international market.

Source: Central Bank of Brazil. Author's elaboration.

<sup>21</sup> It is also important to mention that the centralization of macroprudential and monetary policy responsibilities within the same institution (the Brazilian Central Bank) contributes to the coordination of these two sets of policy tools, thus enhancing the effectiveness of the economic policy.

**Chart 4: Brazil – Real USD Exchange Rate (Nominal) and Capital Management Techniques Applied**



Note: PR = Prudential Regulation; CC = Capital Control; DTM = Derivatives Market Regulation.

Source: Central Bank of Brazil. Author's elaboration.

The currency appreciation trend was only curbed after the Brazilian government implemented a broader set of DMTs at the end of July 2011. The government imposed a financial tax of 1 percent on excessively long positions on BRL in the FX derivatives market; at the same time, it adopted new rules to improve the market's transparency (see table 3 and chart 4). These measures have had a longer-lasting effect as they address not only the marginal requirements but also the notional value of the carry trade operations in the FX derivatives market.<sup>22</sup>

<sup>22</sup> The empirical literature on the efficacy of capital controls has also flourished in tandem with the resumption of CMTs since 2009. Based on an econometric model (a GARCH regression), Baumann and Gallagher (2012) have found that the introduction of capital account regulations in Brazil between October 2009 and December 2012 was associated with a shift from short-term to longer-term inflows. They have also found that Brazil's measures had a lasting impact on the level and volatility of the exchange rate and modestly increased Brazilian monetary policy autonomy. By contrast, Klein (2012) – based on panel and cross-section estimates of the effects of capital controls on GDP growth, volatility, exchange rates, and financial variables across 44 countries over the period 1995–2010 – has found that episodic capital controls are like gates, which can be effective, while long-standing capital controls (such as those of the Chinese) are like walls that protect against the vicissitudes of international capital markets. Klein points to the Brazilian IOF as an episodic control on capital inflows that did not temper the appreciation of the Brazilian currency. However, this finding is probably a result of the period covered (until 2010). As mentioned before, only through the adoption of broader DMTs in July 2011 has the BRL appreciation trend been curbed. It is worth mentioning that

Finally, it is important to mention that the Brazil has been able to launch broad CMT and DMT because since the 1990 the government has been very careful avoiding to make any commitments under the General Agreement on Trade and Services (GATS) and signing any Bilateral Investment Treaties (BITs) or Foreign Trade Agreements (FTAs) that can reduce the country's policy space to implement at any moment these regulations (Paula and Prates 2012).

Although most treaties liberalizing trade in services employ a 'positive list' approach with respect to trade in financial services, capital controls eventually can be inconsistent with obligations if they intervene in cross-border movements of capital related to the service that have been made liberalization commitment. The same concern can be applied to DMT, as non-residents positions in the FX derivatives market involves safety margin and can result in gains that will be converted to USD and then will be transferred abroad.

#### **4. Conclusion: Lessons from the Cases of Brazil and Korea for Capital Management Techniques**

In this paper, we have argued that the advances made by the IMF in its recent capital account management framework are significant and should be applauded insofar as they address the need to add capital controls to the macroeconomic toolkit. However, we have also demonstrated that both a closer look at this framework and an empirical analysis of the measures applied in Korea and Brazil in recent times illuminate the limits of the IMF approach.

First and most importantly, the IMF's efforts to draw a line between permanent macroprudential measures for financial stability on the one hand and temporary measures to influence the exchange rate on the other are unsustainable. The theoretical analysis and the country studies demonstrate that both goals, and their respective target instruments, are interdependent. As emerging markets with open financial accounts and sophisticated financial markets, Brazil and Korea exemplify the feedback loops between capital controls and prudential financial regulation, as well as those between these measures and macroeconomic policy. In the case of Korea, prudential regulation of the domestic financial sector has had a strong influence on capital inflows as banks are the only agents with access to short-term external credit required for the provision of over-the-counter foreign exchange contracts, where gains or losses are liquidated in US dollars. Thus, prudential financial regulation is the key instrument for

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none of these studies (including the recent IMF papers) considers the regulation of FX derivatives in Brazil as another kind of regulation distinct from capital controls and financial prudential regulation (or capital account regulations). This distinction is an important specificity of this paper's approach.

tackling the main causes of external vulnerability and currency appreciation. In Brazil this regulation encompasses only financial institutions; therefore, a capital control measure (taxation of foreign loans) has been necessary to curb firms' foreign debt and thus ensure financial stability. We have thus drawn on the concept brought forward by Epstein, Grabel and Jomo (2004), who precisely define capital management techniques as the sum of capital controls and prudential financial regulation. We have also added derivatives management techniques, which have protected Brazil's exchange rate from appreciation pressures, to the toolkit.

Second, the case studies show that country-specific factors, specifically macroeconomic and institutional aspects, have to be taken into account in the designing of tailor-made specific measures. The macroeconomic environment has an important influence on the effectiveness of capital management techniques. As the Brazilian experience highlights, a wider interest rate differential stimulates regulatory arbitrage. In this context, measures have to be even more dynamic, flexible and adjustable, involving a steady "fine-tuning" to close the loopholes encountered by private agents in spot and foreign exchange derivatives transactions. With regard to institutional features, the Brazilian case shows the relevance of tailor-made regulation in the context of highly sophisticated financial markets. Here, the level and sophistication of foreign exchange derivatives operations have necessitated a third type of regulation, which we have labeled derivative market techniques. Only when these were added to Brazil's capital controls and prudential financial regulation did the policy effectiveness in terms of protecting the exchange rate from downward pressure increase. Additionally, the Brazilian case serves as an example that the effect of foreign investors' portfolio decisions on the exchange rate may be delinked from the volume of international capital flows. As derivative operations are liquidated in Brazilian currency (nondeliverable), they are likely to impact the exchange rate with very low or even without any international capital inflows or outflows taking place. Thus, global rules for managing capital controls have to be sufficiently general to give the individual countries enough policy space to adjust them to their needs.

Third, we have argued against the qualification of capital controls as only temporary and unilateral means in specific circumstances. As global liquidity is provided asymmetrically among countries, less developing economies are particularly vulnerable to global liquidity shocks given the limited international use of their currencies. Capital management techniques should thus form part of emerging economies' permanent toolkit to prevent the risks of sustained external deficits and currency overvaluation and to open up domestic policy space for growth-oriented and redistributive policies, as Gallagher, Griffith-Jones and Ocampo (2012) have pointed out. At the same time, domestic policies, especially those of bigger, advanced countries have spillover effects

on the rest of the world. As liquidity provision may be important for countercyclical policies in these cases, a multilateral framework should also embrace policies to contain capital outflows from advanced economies.

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